United States
Environmental Protection
Agency

Industrial Environmental Research
Laboratory
Research Triangle Park NC 27711

EPA 600/2-79-190
September 1979

PB80-100399

Research and Development

EPA

Level 1 Assessment of Uncontrolled Q-BOP Emissions

2.0 CONCLUSIONS

This test at a Q-BOP was conducted to determine if potentially hazardous materials are produced during the hot metal addition cycle of the process. Tests were conducted by IERL-RTP Level 1 procedures in the secondary emission collection system during eight hot metal additions (four process cycles).

The particulate emissions are given in Table 1. During the brief period of actual hot metal addition, particulates are emitted at a fairly high rate (1300 mg/m^3). Emissions are not excessive, however, when calculated on a Kg/ton of charge or Kg/cycle basis. Data in Table 11, Section 4 show that about 69 percent of the particulate is greater than 10 microns and 14 percent falls in the 1-3 μ size. It is important to realize that testing occurred only during actual hot metal addition. Thus these results do not reflect emissions which occur during the O_2 blow cycle or during other periods when the vessel is turned down (i.e., scrap charge, metal sampling, etc.) or the brief period between hot metal addition from the two ladles.

TABLE 1. SUMMARY OF PARTICULATE DATA--UNCONTROLLED EMISSIONS

Stack Gas Volumetric Flowrate, m^3/min		11,495*
Particulate Concentration, mg/m^3		1,300
Particulate Generated, Kg/min		14.9
	Kg/average cycle (257 tons charged)	32.9
	Kg/ton hot metal added (average)	0.16
	Kg/ton steel scrap (average)	0.64
	Kg/ton of total charge	0.13

*Average flowrate during preliminary tests was 9,372 m^3/min which is consistent with system design value.

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PB81-244808

Proceedings: Symposium on Iron and Steel Pollution Abatement Technology for 1980 (Philadelphia, PA, 11/18–11/20/80)

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Contract No. 68-02-3152
Task No. 3
Program Element No. 1BB610

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EPA Project Officer: Robert V. Hendriks

Industrial Environmental Research Laboratory
Office of Environmental Engineering and Technology
Research Triangle Park, NC 27711

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Research and Development
Washington, DC 20460

BOF AND Q-BOP HOT METAL CHARGING EMISSION COMPARISON

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ABSTRACT

Fumes generated during hot metal charging of a BOF and a Q-BOP were sampled and analyzed for total particulates, particulate mass in four size ranges, and inorganic and organic compounds. The data indicate that the Q-BOP generates three times as much particulate and 15 times as much organic matter per megagram of hot metal charged as does the BOF. Polynuclear aromatic hydrocarbons (PNA) were found in the Q-BOP fume but not in the BOF fume. No carcinogenic PNAs were detected.

The differences found are probably due to the additional time required to charge hot metal into the Q-BOP at the particular plant sampled as compared to the BOF (2.2 minutes for the Q-BOP versus 1.0 minutes for the BOF) and to blowing of nitrogen gas into the bottom of the Q-BOP during the charging operations.

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TABLE 4. PARTICULATE MASS DATA FOR BOF AND Q-BOP*

Size Range	BOF		Q-BOP	
	lb/ton	kg/Mg	lb/ton	kg/Mg
<1 μm	11.6×10^{-3}	5.8×10^{-3}	7.0×10^{-3}	3.5×10^{-3}
1-3 μm	16.8×10^{-3}	8.4×10^{-3}	49.4×10^{-3}	24.7×10^{-3}
3-10 μm	28.0×10^{-3}	14.0×10^{-3}	18.6×10^{-3}	9.3×10^{-3}
>10 μm	37.0×10^{-3}	18.5×10^{-3}	242×10^{-3}	121×10^{-3}
Probe, Cyclone Washes	13.4×10^{-3}	6.7×10^{-3}	35.0×10^{-3}	17.5×10^{-3}
Totals:	10.6×10^{-2}	5.3×10^{-2}	35.2×10^{-2}	17.6×10^{-2}

*Calculated on the basis of hot metal added.

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
PB-281 322

Fugitive Emissions from Integrated Iron and Steel Plants

Midwest Research Inst, Kansas City, Mo

Prepared for

Industrial Environmental Research Lab, Research Triangle Park, N C

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TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)		
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16. ABSTRACT The report gives results of an engineering investigation of fugitive (non-ducted) emissions in the iron and steel industry. Operations excluded from the study are coke ovens, basic oxygen furnace (BOF) charging, and blast furnace cast houses. Fugitive emission factors for iron and steel sources were compiled from the literature and from contact with industry sources. Field testing of particulate emissions from materials handling operations and from traffic on paved and unpaved roads was utilized to develop improved emission factors for open fugitive emission sources. Ranking fugitive sources on the basis of typically controlled fugitive emissions of fine particulates (< 5 microns in diameter) indicates that electric furnaces, vehicular traffic, BOFs, storage pile activities, and sintering, in decreasing order, are the most important sources of fugitive emissions studied. Substantial progress has been made in developing devices and methods for emission capture and removal. However, major problems exist in retrofitting proposed systems to existing operations. There is also a serious lack of data on uncontrolled emission quantities, control device effectiveness, and control costs.

17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Iron and Steel Industry Emission Dust Materials Handling Vehicular Traffic Electric Furnaces Stockpiles Sintering	Air Pollution Control Stationary Sources Fugitive Emissions Particulates	13B 11F 13A 11G 13H
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EPA Form 2220-1 (9-73)

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composition of emissions from sources downstream of the windbox is the same, since the sinter undergoes only physical handling and sizing processes.

2.1.3 Hot Metal Transfer

Source Description--

Every BOF shop and most OHF shops have a hot metal transfer station. At these stations, the torpedo car from the blast furnace pours molten iron either into the charging ladle or into a mixer which is subsequently tapped into the charging ladle. It is the violent mixing during these pours that produces iron oxide emissions. Another type of emission produced is kish, which consists of carbonaceous, flake-like particles that leave the molten iron as it begins to cool.

Source Extent--

In 1976, 82,900,000 tons of hot metal were produced within the industry and virtually all of this hot metal was transferred prior to processing.

Emissions Characteristics--

Table 2-2 shows that the fugitive particulate emissions from the hot metal transfer station are coarse in comparison to the other process fugitive emissions. This is due mainly to the fact that the kish, which is much larger in size than the iron oxide particles, is produced in greater weight, thus shifting the combined size distribution toward the coarse end of the spectrum.

2.1.4 Hot Metal Desulfurization

Source Description--

Fugitive emissions are generated by the addition of desulfurizers to hot metal at a position between the blast furnace and the steel-making furnace. Emissions result from (a) agitation of the hot metal as the desulfurizer is added, (b) handling of the desulfurizer, (c) natural rejection of carbon by the hot metal, and (d) skimming of the slag into a pot.

Source Extent--

The percentage of hot metal presently desulfurized between the blast furnace and the steel furnaces has not been published.

Emission Characteristics--

Little is known concerning the characteristics of emissions from hot metal desulfurization. One of the constituents is kish, which has been previously described. Another of the constituents is iron oxides arising from the agitation of the hot metal. A third constituent of the emissions is the desulfurizer itself. Some possible desulfurizers are CaC_2, CaO, $NaCO_3$, NaOH, Mg, and $CaCO_3$.

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TABLE 3-3. AVAILABLE PARTICLE SIZE DATA FOR PROCESS SOURCES[a]

Source	Bibliography reference number	Weight % less than given particle diameter (µm) 300	90	80	70	60	50	40	30	20	10	5	1
1. Sintering													
Windbox waste gases (before control)	4	40-89						14-30		6-33	2-14	2-7.5	
	4	40						30		19	12	8	2
	4	55						20		16	8	9	0.5
	26	50											
Cooler	-											10	
2. Hot metal transfer	27	60		50			30				16	10	
3. EAF													
Primary waste gases (before control)	28							90		85	75	68	
	28							90		86	80	72	
	28							90		83	83	72	
	28							100		98	95	57	
	28							97		89	81	63	
	28							100		97	91	59	
	28							82		67	61	43	
	26											70	
4. BOF													
Noncombusted system	4								67	58	18	9	
Combusted system	4					15		66		56	50	6	
	4									100[b]			85
5. OHF	-												
Composite sample	4							94		85	70	68	
	28							90		86	72	65	
Lime-boil sample	4									98	92	75	37
	4												70
6. Scarfing	-											90	

a/ These size distributions are for uncontrolled, ducted emissions. For lack of other data, fugitive emission particle size distributions will be assumed to be identical to ducted emission distributions.

b/ Actually, 100% is less than 15 µm.

USS DIVISION OF USX CORPORATION
LORAIN WORKS
LORAIN, OHIO

Hot Metal Desulfurization Emissions Factor

A contractor removes and trucks collected material from the hot metal desulfurization bag house box dump. The trucks are not weighed nor are the number of truck loads removed from each piece of control equipment recorded.

It was decided that it would be desirable to develop an emission factor for the amount of solids generated per unit of production at the hot metal desulfurization stations.

A program was initiated in January, 1985 in which trucks were weighed and the number loads removed was recorded for a five month period.

QUANTITIES OF DUST REMOVED FROM
BOP HOT METAL DESULFURIZATION
POLLUTION CONTROL EQUIPMENT

	BOP H.M. DESULF. No. Clean Outs	lbs
January 1985	15	61500
February 1985	10	41000
March 1985	19	77900
April 1985	23	94300
May 1985	18	73800
	85	348500.

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Summary - Hot Metal Desulfurization

	No. Truck Loads	Total Weight (LBS)	BOP Prod Tons Liq Steel	Avg. H.M. Factor	Desulfurization Station Tons Hot Metal
Jan-May 85	85	348500	826044	91.81	758391

Emission Factors: Lbs/Ton Liquid Steel $\frac{348500}{826044} = \underline{0.42}$

Lbs/Ton Hot Metal $\frac{348500}{750391} = \underline{0.46}$

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USS DIVISION OF USX CORPORATION
LORAIN WORKS
LORAIN, OHIO

Process Description

The hot metal desulfurization facility at Lorain Works consists of two lance stations which pneumatically inject lime magnesium through a lance into the hot metal charging ladle to reduce the sulfur content.

Emission Controls

Emissions generated during the desulfurizing and slag skimming operations are captured by a movable hood car at each station and vented to a bag house.

ENSR

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March 19, 1992

Mr. Shri Harsha
Office of Air Management
Indiana Department of Environmental Management
105 South Meridian Street
Indianapolis, IN 46206-6015

Subject: Detailed Explanation of the Coke Oven Fugitve and Coke Quench Tower PM_{10} Emission Estimates Developed for USS Gary Works

Dear Mr. Harsha:

ENSR Consulting and Engineering has developed the above referenced information as a result of our meeting on March 11, 1992 and in support of the overall Lake County PM_{10} Attainment Demonstration. We would like to point out to IDEM that for virtually every step in the coke oven fugitives and quench tower emission estimation process that involved engineering estimates, ENSR used published USEPA data and conservative judgements that resulted in higher emission rates. ENSR evaluated battery performance data provided by USS to determine the best estimates for estimating coke oven fugitives for the #2, #3, #5 and #7 batteries at the Gary Works facility. The quench tower emissions data used by ENSR are from the results of a prior source testing study conducted at the Gary Works by TRC which was summarized in a 1980 report. Based on the availability of particulate emissions data for the various release sources present at coke plants, our emission estimates accurately reflect current conditions at the Gary Works.

Based on our previous discussion regarding ENSR's and IDEM's emission estimation approaches, we would like point out four (4) issues which were addressed by ENSR for the coke plant PM_{10} emission estimates, but not by IDEM:

1: **PM_{10} Splits for Coke Oven Fugitives:** When USEPA PM_{10} split data existed we applied this information to develop PM_{10} emission factors. For sources that PM_{10} data was not available and Gary Works data indicated excellent battery performance (i.e. door, topside and offtake leaks) our judgement was to set the PM_{10} split at 100%. This approach is conservative, i.e. it overpredicts emission rates.

2: **Control Efficiencies for Door Leaks:** The Gary Works coke batteries currently perform at better than 10 percent leaking doors (PLDs). Since the lowest published mass emission test is for 16% PLDs, the shape of the mass emission:PLD curve is highly uncertain below about 10% PLDs. Thus ENSR used the RTI model developed for USEPA at 10% PLDs, rather than at the actual Gary Works battery performance levels. This approach is conservative, i.e. it overpredicts emission rates.

3: **PM_{10} Splits for Coke Quench Towers:** When the TRC study was conducted on the #3 and #5 quench towers at Gary Works, particle size data was not collected. AP-42 PM_{10} split data for dirty water quenching with baffles indicates that the PM_{10} split is 32.3% ENSR notes that a USEPA testing study at the USS Lorain Works quench tower produced a 22% PM_{10} split for dirty water quenching with baffles (See attached table from Hendricks et al 1979). Thus by ENSR adopting the AP-42 PM_{10} split for dirty water quenching with baffles we have used a conservative approach, i.e. it overpredicts emission rates.

4: **Emission Rates for Modeling:** ENSR used the production rates indicated in our March 1992 report "PM_{10} NAAQS Attainment Demonstration for the USS Gary Works Facility, ENSR Doc. No. 6975-039-960" and the briefing notes we provided IDEM at our meeting and March 11, 1992 to develop lb per hour emission rates for the process sources at the Gary Works Coke Plant.

We have attached relevant portions of cited documents in the attached calculations for your use. ENSR would be pleased to answer any questions you may have regarding the coke plant fugitive and quench tower PM_{10} emission estimates. Best regards.

Sincerely,

Ronald Harkov, Ph.D. Air Toxics Program Manager	William Kubiak Manager of Environmental Compliance	Richard Dworek Director Environmental Control

Attachments

000096

cc. T. Method
M. Dennis

ENSR Doc. No. 6975-040-800, B1

COKE OVEN FUGITIVE PM_{10} EMISSIONS

I - Charging

A:	**Data/Assumptions**	**Source**
1)	PM_{10} emission factor for stage charging, 0.008 lb PM_{10}/t of coal	AP-42, Supp A, Table 7.2-2

II - Door Leaks

A:	**Data/Assumptions**	**Source**
1)	TSP emission factor for uncontrolled door leaks, 0.54 lbs TSP/t of coal	AP-42, Supp A, Table 7.2-1
2)	Gary Works Battery Performance Data, percent leaking doors (PLDs) is consistently less than 10% PLDs	See February 8, 1991 Letter from Mr. Michael Hanson of USS to Mr. Timothy Method of IDEM
3)	Uncontrolled AP-42 TSP emission factor based on 55% PLDs	ENSR Engineering Estimate

(**Note:** Table 3-11, EPA-450/3-85-028a, mean of data is 51.5% PLDs)

4)	Control efficiency can be estimated using the following equation	RTI report to USEPA (RTI/1736/2-01) EPA Contract No. 68-02-3056

$$E_1/E_2 = (PLD_1/PLD_2)^{2.5}$$

where:

E_1 = Relative controlled Emission Rate, PLD_1 = Controlled PLDs

E_2 = Relative uncontrolled Emission Rate, PLD_2 = Uncontrolled PLDs.

5)	PM_{10} split = 100%	ENSR Engineering Estimate

B: **Emission Estimate**

To develop this emission estimate it was necessary to use the uncontrolled and controlled PLDs, uncontrolled TSP emission rate, and a conservative PM_{10} split, or:

- I: Uncontrolled PLDs = 55%;
- II: Controlled PLDs = 10%;
- III: Uncontrolled TSP emission factor, 0.54 lb/t of coal; and
- IV: Conservative PM_{10} split = 100%, or 1.0.

Thus;

Step 1: Estimate Relative Emission Rates

$$E_1/E_2 = (PLD_1/PLD_2)^{2.5}$$

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or,

$$E_1/E_2 = (10/55)^{2.5}$$

Thus;

$$E_1/E_2 = 0.014$$

Step 2: Estimate Control Efficiency at 10% PLDs

Control Efficiency = 1 - 0.014 or,

0.986 or 98.6% control efficiency

Step 3: Estimate PM_{10} Emission Factor at 10% PLDs

(0.54 lb TSP/t coal) * (0.014) * (1.0, PM_{10} split) = 0.00756 lb PM_{10}/t coal

or by rounding, 0.008 lb PM_{10}/t coal

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III - Pushing

A:	Data/Assumptions	Source
1)	Batteries #2 and #3 have mobile scrubber cars	USS Gary Works
2)	Batteries #5 and #7 have movable hoods with baghouses	USS Gary Works
3)	TSP emission factor for pushing with mobile scrubber cars, 0.072 lbs TSP/t of coal	AP-42, Supp A, Table 7.2-1
4)	PM_{10} emission factor for pushing with mobile scrubber cars, 0.023 lbs TSP/t of coal	AP-42, Supp A, Table 7.2-2
5)	TSP emission factor for pushing with movable hood w/baghouses, 0.09 lbs TSP/t of coal	AP-42, Supp A, Table 7.2-1
6)	PM_{10} emission factor for pushing with movable hood w/baghouses, 0.0288 lbs TSP/t of coal, based on estimate of PM_{10} split of 32%	ENSR Engineering Estimate, Same as PM_{10} split on mobile scrubber cars (See - AP-42, Supp A, Table 7.2-2)

B: **Emission Estimate**

To develop the emission factor for #5 and #7 pushing controls it was necessary to use the controlled TSP emission factor, and a conservative PM_{10} split, or:

I: Controlled TSP emission factor, 0.09 lb/t of coal; and
II: Conservative PM_{10} split = 32%, or 0.32.

Thus;

Step 1: Estimate PM_{10} Emission Factor

(0.09 lb TSP/t coal) * (0.32, PM_{10} split) = 0.0288 lb PM_{10}/t coal

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IV - Topside Lids and Offtakes

A:	**Data/Assumptions**	**Source**
1)	Uncontrolled TSP emission factor, of 0.01 lbs TSP/t of coal	1983 letter form USEPA to USS regarding Lake County TSP SIP Development
2)	BSO emission rate difference small topside leaks to large topside leaks is approximately 85%	Table 3-14, EPA-450/3-85-028a
3)	Gary Works Battery Performance Data, percent topside and offtake leaks are consistently less than 1% and 5%, respectively	See February 8, 1991 Letter from Mr. Michael Hanson of USS to Mr. Timothy Method of IDEM
4)	Control efficiency conservatively estimated at 90% from uncontrolled conditions	ENSR Engineering Estimate
5)	PM_{10} split = 100%	ENSR Engineering Estimate

B: **Emission Estimate**

To develop the emission factor for topside lids and offtakes it was necessary to use the uncontrolled TSP emission factor, a control efficiency and a conservative PM_{10} split, or:

I: Uncontrolled TSP emission factor, 0.01 lb/t of coal;
II: Control efficiency 90% or, 1-0.9 = 0.1; and
III: Conservative PM_{10} split = 100%, or 1.0.

Thus;

Step 1: Estimate PM_{10} Emission Factor

(0.01 lb TSP/t coal) * (0.1, uncontrolled) * (1.0, PM_{10} split) = 0.001 lb PM_{10}/t coal

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V - Total Coke Battery Fugitive PM_{10} Emissions

#2 and #3 Batteries

Source	Emission Factor, lbs PM_{10}/t of coal
Charging	0.008
Door Leaks	0.008
Pushing	0.023
Lids/Offtakes	0.001
Total	0.04

#5 and #7 Batteries

Source	Emission Factor, lbs PM_{10}/t of coal
Charging	0.008
Door Leaks	0.008
Pushing	0.0288
Lids/Offtakes	0.001
Total	0.046

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COKE QUENCH TOWER PM_{10} EMISSIONS

A: Data/Assumptions	Source
1) TSP emission factor for #2 and #3 quench towers, 0.45 lb PM_{10}/t of coal	Source Test Report by TRC, at Gary Works September 12, 1980
2) TSP emission factor for #5 and #7 quench towers, 0.64 lb PM_{10}/t of coal	Source Test Report by TRC, at Gary Works September 12, 1980
3) PM_{10} split = 32.3%	AP-42, Supp A, Table 7.2-2, quench towers - dirty water with baffles

B: **Emission Estimate**

To develop the PM_{10} emission factor for #2, #3, #5 and/or #7 quench towers it was necessary to use the measured TSP emission factor, and a conservative PM_{10} split, or:

I: Controlled TSP emission factor, 0.45 lb/t of coal for #2/#3 towers and 0.64 lb/t for #5/#7 towers; and
II: Conservative PM_{10} split = 32.3%, or 0.323.

Thus;

Step 1: Estimate PM_{10} Emission Factor for #2/#3 Quench Towers

(0.45 lb TSP/t coal) * (0.323, PM_{10} split) = 0.145 lb PM_{10}/t coal

Step 2: Estimate PM_{10} Emission Factor for #5/#7 Quench Towers

(0.64 lb TSP/t coal) * (0.323, PM_{10} split) = 0.207 lb PM_{10}/t coal

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RTI/1736/2-01
March 1980

A MODEL TO ESTIMATE HAZARDOUS EMISSIONS FROM COKE OVEN DOORS

by

C. C. Allen, Jr.
Research Triangle Institute
P. O. Box 12194
Research Triangle Park, NC 27709

EPA Contract No. 68-02-3056

Project Officer

Lee Beck
Industrial Studies Branch
Emission Standards and Engineering Division
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Research Triangle Park, NC 27711

Prepared for

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711

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6.0 THE RELATIONSHIP BETWEEN PERCENT LEAKING DOORS AND MASS EMISSIONS

The percent leaking doors is a function of the gap size: larger gap sizes between the door sealing edge and the oven jamb require longer times to self-seal. These longer sealing times permit a larger fraction of the doors to leak simultaneously, and careful adherence to maintenance gap specifications is essential for reducing the sealing times. The larger gaps not only permit the emissions to persist longer but also emit more pollutants per unit time.

Equation 9 demonstrates how the gap size may be estimated from the percent leaking doors (PLD).

$$G = 6.5 \times 10^{-4} \sqrt[3]{PLD} \qquad (9)$$

The emissions may be estimated from the gap size with Equation 8. The results of the calculations are presented in Table 6 and Figure 3 for the model coke oven. From this model, the mass rate of emissions are dramatically affected by the gap size and directly related to the percent leaking doors. Decreasing the percent leaking doors from 25 to 5 percent results in an estimated reduction in emissions of 98 percent, for example.

The relationship between the percent leaking doors and the emissions is presented in Figure 4. The results of the calculations are plotted on a log-log graph and an approximately linear relationship exists between the variables for the PLD range of interest (5-25 percent). The slope of this line is 2.5, implying that the emissions vary with the 2.5 power of PLD. A lesser slope of 1.6 is present for the function at values less than 5 PLD.

The slope of 2.5 can be useful in estimating percent reduction in emissions.

$$\frac{E_1}{E_2} = \left(\frac{PLD_1}{PLD_2}\right)^{2.5} \qquad (10)$$

A reduction in PLD from 50 to 5, for example, results in emission reductions of $(0.1)^{2.5} = 0.0032$ or 99.7 percent. From Figure 4, the estimated emissions would be reduced from 840 kg (1848 lb) per door to approximately 2 kg (4.4 lb) per door per cycle, or 99.8 percent.

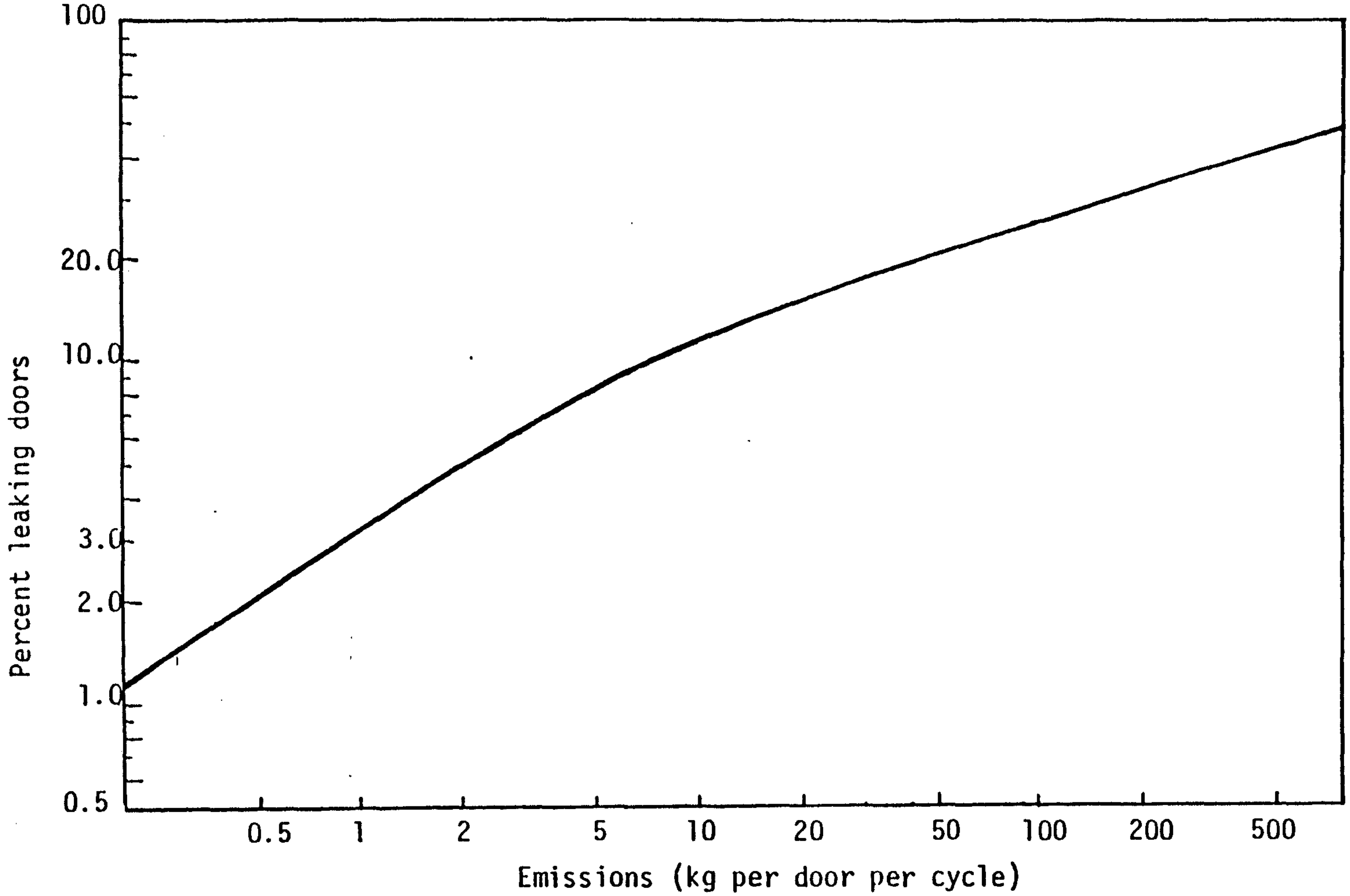

Figure 4. The relationship between the estimated percent leaking doors and the emissions.

KSHAC

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-450/3-85-028a
April 1987

Air

EPA

Coke Oven Emissions from Wet-Coal Charged By-Product Coke Oven Batteries— Background Information for Proposed Standards

Draft EIS

PB87-1 92787

NESHAP

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TABLE 3-11. COKESIDE SHED TEST RESULTS

Test	Kilograms of BSO per hour	Percent leaking doors	Number of leaking doors	Kilograms of BSO per hour per leaking door
Wisconsin Steel Shed[30]	7.0	73	33	0.21
	5.9	78	35	0.17
	5.4	60	27	0.20
	6.0	69	31	0.19
Average	6.1	70	32	0.19
ARMCO, Inc. Shed[12]	6.8	16	10	0.68
	11	31	19	0.59
	13	39	24	0.55
Average	10.3	29	18	0.58
Bethlehem Steel, Burns Harbor[10]	3.9	--	--[a]	--[a]
	3.9	50[b]	41[b]	0.10[b]
Bethlehem Steel, hoods[10]	0.22[c]	--	1	0.22[c]

[a] The number of leaking doors was not reported.

[b] Assumes that 50 percent of the 82 doors were leaking.

[c] This value is for toluene solubles from a pusherside hood over the door.

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TABLE 3-14. TOPSIDE LEAK EMISSION TEST[13]

Leak size[a]	BSO (kg/hr)	BaP (kg/hr)
Large	0.002[b]	--
	0.017	--
	0.035	--
	0.012	0.00022[c]
Average	0.021	--
Small	0.0017	--
	0.0029	--
	0.0053	0.000072[c]
Average	0.0033	--

[a]A large leak yields a 1- to 2-meter (3- to 6-foot) visible plume. A small leak yields a 0.3-meter (1-foot) visible plume.

[b]Experimental run: vent was partially plugged and flow was restricted.

[c]These values are 1.4 to 1.8 percent of the BSO.

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Environmental Control
Environmental Affairs

February 8, 1991

Timothy J. Method
Assistant Commissioner
Office of Air Management
Indiana Department of Environmental Management
105 South Meridian Street
P. O. Box 6015
Indianapolis, IN 46206-6015

Subject: **Response to Comments Provided by the Indiana Department of Environmental Management (IDEM) Regarding the USS Gary Works PM_{10} Inventory**

Dear Mr. Method:

The following letter is a response to the written comments provided by IDEM to USS and ENSR at our December 14, 1990 meeting at your offices in Indianapolis. The discussion that follows is organized on a Gary Works production area basis.

Coke Plant

1. IDEM was concerned about the status of Nos. 15 and 16 coke batteries. USS desires not to alter the current permit status of these operations and would have these sources contributing zero emissions to the PM_{10} inventory for the facility. USS is aware that before Nos. 15 and 16 coke batteries become active we would be required to seek a SIP revision.

2. Attached are some recent battery leak detection results from the Gary coke plant operation and maintenance program. ENSR (in their report) has not "relaxed" the percent leaking doors for the coke batteries at Gary Works. Since the lowest quantitative emission test for door leaks is for about 16% door leaks, it is their technical judgement that the actual shape of the percent door leak to mass emission curve is very uncertain below about 10% leaking doors. The Gary Works coke batteries normally are below 8% leaking doors. The attached reports for October - December 1990 show door leaks from 0.4% - 3.1% monthly averages.

3. The percent control efficiency estimate for 10% leaking doors was computed from equation 10 on page 16 in a Research Triangle Institute report completed for USEPA (See Attachment). This model is also discussed in the wet-coal charging BID (EPA 1987). ENSR assumed that 55% leaking doors is an uncontrolled emission state, then at 10% door leaks the percent of the uncontrolled emission rate is estimated to be about 1.4%. Thus the estimated controls efficiency for 10% versus 55% leaking doors is approximately 98.6% or 0.008 lbs/ton based on a 0.54 lbs/ton uncontrolled emission rate. We would like to emphasize that the uncontrolled door leak factors contained in AP-42 were generated during a period when the percent door leaks at many coke plants were typically greater than 50%. Also, since Gary Works batteries typically have less than 8% door leaks, the actual control efficiency is likely to be greater than 99% when compared with uncontrolled door leak emission rates.

4. The PM_{10} emission factor utilized by ENSR for stage charging (0.008 lbs/ton) can be found in Table 7.2.2 in Supplement A of AP-42.

<u>Sinter Plant</u>

1. IDEM did not provide any substantive comments regarding this portion of the PM_{10} inventory.

<u>Blast Furnaces</u>

1. USS wishes to operate the blast furnaces as indicated in the PM_{10} inventory. USS is aware that such changes in production limits are likely to impact the current SO_2 SIP revision compliance study.

2. Under separate cover (1/14/91), USS has provided IDEM justification for the 90% PM_{10} control efficiency for the fume suppression system.

<u>#1 BOP Shop</u>

1. Prior to October, 1990, the normal vessel angle during hot metal charge was 320°-323° or 37°-40° from vertical. In October, tests were run at a steeper vessel angle so that the mouth of the vessel is closer to the gas cleaning hood. As a result of these tests

it was determined that improved capture efficiency could be achieved at the steeper angle and, consequently, the new practice calls for 328° plus or minus two degrees. At the steeper angle during the October tests the highest two minute average roof monitor opacity was 15.6% and most of the rest were in single digits.

2. Under separate cover (1/14/91) USS has provided IDEM with a justification for the 80% fume suppression efficiency utilized for tapping and HMT.

3. There is no estimate of kish removal emission rates because ENSR could not identify a suitable emission factor or emission factor analogy to estimate the particulate emissions from this intermittent source.

4. USS believes we have provided IDEM with as complete an inventory of the PM_{10} sources within the BOP shop that is possible based on current source characterization data available from Gary Works, USEPA and the open technical literature. Since the present Gary Works BOP shop PM_{10} inventory is less than the proposed IDEM PM_{10} limits, no further air pollution controls should be required for this process unit.

#2 Q-BOP Shop

1. IDEM believes that kish removal, skull burning, ladle dumping, and slag tapping should be included in the PM_{10} inventory for the Q-BOP shop. ENSR could not identify suitable emission factors or emission factor analogies to estimate the particulate emissions from these intermittent sources. These sources are normally likely to be minor contributors to roof monitor emissions. For example, utilizing a poor analogy for kish removal from AP-42, such as the PM_{10} emission factor for batch dropping of low silt slag (0.0043 lbs/ton), indicates that this source could, on a worst case basis, represent less than 2% of the total estimated Q-BOP roof monitor PM_{10} emission rates.

2. Scrap charging should produce much less PM_{10} emissions than hot metal charging. The present charging factor was applied to the entire hourly steel production of 625 T/hr, whereas the derivation of the charging factor is based on lbs/ton of hot metal additions. The attached report was used to develop the Q-BOP charging emission factor.

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3. The emission factor of 0.05 lbs/per ton for hot metal transfer already recognizes dual handling of the hot metal at the mixers. Therefore, it is not reasonable to double this figure.

4. USS is reviewing the feasibility of various control options to achieve an estimated roof monitor PM_{10} removal efficiency of about 95%. These control methods should have a substantial reduction on the estimated PM_{10} off-site impacts from the Q-BOP shop.

Area Sources

1. IDEM did not provide any substantive comments regarding this portion of the PM_{10} inventory.

Boilers

1. Based on the current limits in the SO_2 SIP, ENSR assumed that coal could not be utilized as a fuel in the #2 Coke Plant Boilerhouse, however IDEM assumed that the boiler was using coal as a fuel. IDEM should correct their inventory to reflect the SO_2 SIP fuel use restrictions.

Although ENSR received some information from IDEM at our December 14, 1990 meeting, the data tape was not formatted properly for their use. On December 31, 1990, ENSR returned the data tape to IDEM and requested that the tape be formatted in ASCII with a record length of 80 and 10 records per block. IDEM has assured ENSR that they would receive information regarding the model source inputs, determination of background, meteorological data etc., however as of the date of this letter ENSR has not received these items. ENSR would appreciate receiving this information as soon as possible.

If you have any questions regarding the above, please feel free to contact me at 412-825-2416 or Ron Harkov at 908-560-7323.

Very truly yours,

MAHanson

MAH/cg

cc: Paul Dubenetzky
Ron Harkov
Shri Harsha
Bill Kubiak
Leo Pruett

000114

USS - Gary Works
Self Monitoring Summary
Coke Batteries -October 1990

Battery No.	Date	Doors Percent of Doors Leaking	Col. Main No. of Leaks	Lids Percent of Lids Leaking	Offtakes Percent of Offtakes Leaking	Charging Total Seconds of Emission Per 5 Charges	Pushing Average Opacity For 4 Pushes	Stack No. of 6-Min Averages >30% Opacity Per Hour
2	10-02-90	0.0%	0	0.0%	0.0%	0	8.5%	0
	10-06-90	3.5%	0	0.4%	0.0%	11	5.8%	0
	10-08-90	5.2%	0	0.0%	0.9%	13	11.4%	0
	10-13-90	1.7%	0	0.0%	0.0%	15	8.4%	0
	10-15-90	2.6%	0	0.0%	0.0%	6	7.2%	0
	10-20-90	7.0%	0	0.9%	0.0%	20	9.8%	0
	10-22-90	0.0%	0	0.0%	1.8%	20	7.1%	0
	10-26-90	0.0%	0	0.9%	0.9%	27	5.3%	0
	10-29-90	7.9%	0	0.4%	0.9%	38	6.6%	0
Average		3.1%	0	0.3%	0.5%	17	7.8%	0
3	10-03-90	0.0%	0	0.5%	0.0%	10	8.3%	0
	10-11-90	0.0%	0	0.0%	0.0%	33	14.4%	0
	10-13-90	1.0%	0	0.0%	0.0%	37	12.5%	0
	10-18-90	0.0%	0	0.0%	0.0%	0	14.2%	0
	10-20-90	0.0%	0	0.0%	0.0%	10	7.1%	0
	10-24-90	0.0%	0	0.0%	0.0%	4	6.6%	0
	10-27-90	0.0%	0	0.0%	0.0%	7	10.4%	0
	10-30-90	6.7%	0	0.5%	4.8%	15	12.3%	0
Average		1.0%	0	0.1%	0.6%	15	10.7%	0

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*No Inspection

USS - Gary Works
Self Monitoring Summary
Coke Batteries -October 1990

Battery No.	Date	Doors Percent of Doors Leaking	Col. Main No. of Leaks	Lids Percent of Lids Leaking	Offtakes Percent of Offtakes Leaking	Charging Total Seconds of Emission Per 5 Charges	Pushing Average Opacity For 4 Pushes	Stack No. of 6-Min Averages >30% Opacity Per Hour
5	10-03-90	6.4%	1	0.0%	5.8%	72	4.7%	0
	10-06-90	0.0%	0	0.0%	1.3%	24	8.0%	0
	10-08-90	0.0%	0	0.0%	0.6%	6	6.7%	*
	10-11-90	0.0%	1	0.0%	0.0%	37	11.5%	0
	10-15-90	0.0%	0	0.0%	0.0%	3	3.5%	0
	10-18-90	0.0%	0	0.0%	0.0%	3	4.3%	0
	10-22-90	0.0%	0	0.0%	0.0%	3	2.4%	0
	10-27-90	1.9%	0	0.0%	0.6%	11	5.8%	0
	10-29-90	0.6%	0	0.0%	0.0%	20	2.9%	0
	10-30-90	0.0%	0	0.0%	0.0%	7	2.0%	0
Average		0.9%	0	0.0%	0.8%	19	5.2%	0
7	10-02-90	0.0%	*	*	*	*	5.8%	*
	10-03-90	0.0%	0	0.4%	3.9%	14	6.0%	0
	10-06-90	2.6%	0	0.0%	3.9%	9	18.9%	0
	10-08-90	1.3%	0	0.0%	1.3%	13	2.5%	*
	10-11-90	0.0%	0	0.0%	0.0%	2	3.3%	*
	10-15-90	5.1%	0	0.0%	1.9%	2	3.1%	3
	10-18-90	0.0%	0	0.0%	4.5%	43	8.7%	0
	10-22-90	0.0%	0	0.0%	0.0%	5	5.9%	0
	10-27-90	0.0%	0	0.0%	1.2%	17	6.3%	0
	10-29-90	3.9%	0	0.0%	0.2%	19	2.0%	6
	10-30-90	0.6%	0	0.0%	1.2%	4	6.3%	*
Average		1.2%	0	0.04%	1.8%	13	6.3%	1.29
Limitation:		10.0%	3	3.0%	10.0%	125	20.0%	30.0%

* = No Inspection

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*No Inspection

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USS - Gary Works
Self Mônitoring Summary
Coke Batteries - November 1990

Battery No.	Date	Doors Percent of Doors Leaking	Col. Main No. of Leaks	Lids Percent of Lids Leaking	Offtakes Percent of Offtakes Leaking	Charging Total Seconds of Emission Per 5 Charges	Pushing Average Opacity For 4 Pushes	Stack No. of 6-Min Averages >30% Opacity Per Hour
2	11-03-90	4.5%	0	0.4%	0.0%	10	8.8%	0
	11-08-90	0.9%	0	0.0%	0.0%	22	1.7%	0
	11-10-90	0.0%	0	0.4%	1.7%	31	4.4%	0
	11-15-90	0.0%	0	0.0%	0.8%	28	7.0%	0
	11-17-90	9.6%	0	0.4%	0.0%	78	6.8%	0
	11-21-90	0.0%	0	0.0%	0.0%	16	4.5%	0
	11-24-90	6.1%	0	0.0%	1.7%	23	12.3%	0
	11-28-90	0.0%	0	0.0%	0.0%	3	20.8%	0
	11-29-90	3.5%	0	0.9%	1.7%	28	13.6%	0
Average		2.7%	0	0.2%	0.7%	27	8.9%	0
3	11-03-90	3.8%	0	0.0%	0.0%	10	7.3%	0
	11-09-90	0.0%	0	0.0%	0.0%	1	1.8%	0
	11-10-90	0.0%	0	0.0%	0.0%	43	16.5%	0
	11-16-90	0.0%	0	0.0%	1.9%	0	19.0%	0
	11-17-90	0.9%	0	0.0%	0.0%	29	15.8%	0
	11-19-90	0.0%	0	0.0%	1.0%	26	15.2%	0
	11-24-90	3.8%	0	0.0%	1.9%	11	22.1%	2
	11-29-90	0.0%	0	0.0%	0.0%	14	7.4%	0
Average		1.1%	0	0.0%	0.6%	17	13.1%	0

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*No Inspection

USS - Gary Works
Self Monitoring Summary
Coke Batteries - November 1990

Battery No.	Date	Doors Percent of Doors Leaking	Col. Main No. of Leaks	Lids Percent of Lids Leaking	Offtakes Percent of Offtakes Leaking	Charging Total Seconds of Emission Per 5 Charges	Pushing Average Opacity For 4 Pushes	Stack No. of 6-Min Averages >30% Opacity Per Hour
5	11-08-90	0.7%	0	0.0%	0.0%	7	9.2%	0
	11-09-90	0.0%	0	0.0%	0.7%	0	9.0%	0
	11-15-90	0.7%	0	0.0%	3.2%	71	16.8%	0
	11-16-90	0.0%	0	0.4%	1.3%	17	5.8%	0
	11-19-90	2.5%	0	0.4%	3.9%	7	5.1%	0
	11-21-90	0.0%	0	0.0%	0.0%	9	15.1%	0
	11-28-90	0.0%	0	0.0%	1.3%	6	23.7%	0
	11-29-90	0.0%	0	0.0%	3.2%	31	6.6%	*
Average		0.5%	0	0.1%	1.4%	18	9.6%	0
7	11-08-90	0.0%	0	0.0%	2.0%	25	5.8%	0
	11-09-90	0.0%	0	0.0%	0.0%	36	3.7%	0
	11-15-90	0.7%	0	0.0%	9.1%	30	9.4%	2
	11-16-90	1.9%	0	0.0%	0.7%	3	16.1%	*
	11-19-90	0.0%	1	0.0%	2.6%	15	3.9%	0
	11-21-90	0.0%	0	0.0%	0.0%	8	5.5%	0
Average		0.6%	0	0.00%	2.0%	18	6.7%	1.14
Limitation:		10.0%	3	3.0%	10.0%	125	20.0%	30.0%

* = No Inspection

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*No Inspection

USS - Gary Works
Self Monitoring Summary
Coke Batteries - December 1990

Battery No.	Date	Doors Percent of Doors Leaking	Col. Main No. of Leaks	Lids Percent of Lids Leaking	Offtakes Percent of Offtakes Leaking	Charging Total Seconds of Emission Per 5 Charges	Pushing Average Opacity For 4 Pushes	Stack No. of 6-Min Averages >30% Opacity Per Hour
2	12-01-90	0.8%	0	0.0%	0.0%	13	3.7%	0
	12-03-90	0.0%	0	0.4%	0.0%	27	12.0%	0
	12-08-90	2.6%	0	0.4%	4.4%	42	15.2%	0
	12-11-90	0.0%	0	0.0%	0.8%	5	4.5%	0
	12-13-90	1.8%	0	0.0%	0.0%	43	14.4%	0
	12-18-90	0.0%	0	0.0%	0.0%	13	8.3%	0
	12-22-90	4.4%	0	0.4%	4.4%	34	10.0%	0
	12-26-90	0.0%	0	0.0%	0.0%	22	7.4%	0
	12-29-90	5.3%	0	0.0%	1.7%	14	7.7%	0
Average		1.7%	0.0	0.1%	1.3%	23.7	9.2%	0.0
3	12-01-90	0.0%	0	0.0%	0.9%	10	18.1%	0
	12-04-90	0.0%	0	0.5%	1.9%	32	11.8%	0
	12-08-90	0.0%	0	0.4%	0.9%	57	19.6%	0
	12-12-90	7.0%	0	0.4%	0.9%	12	7.1%	0
	12-15-90	2.6%	0	0.0%	0.0%	0	19.4%	0
	12-19-90	0.0%	0	0.0%	0.8%	6	12.4%	0
	12-22-90	1.8%	0	0.0%	0.0%	3	19.2%	0
	12-27-90	2.9%	0	0.0%	1.0%	15	6.7%	0
	12-29-90	2.8%	0	0.0%	0.0%	9	7.0%	0
Average		1.9%	0.0	0.1%	0.7%	16.0	13.5%	0.0

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*No Inspection

USS - Gary Works
Self Monitoring Summary
Coke Batteries - December 1990

Battery No.	Date	Doors Percent of Doors Leaking	Col. Main No. of Leaks	Lids Percent of Lids Leaking	Offtakes Percent of Offtakes Leaking	Charging Total Seconds of Emission Per 5 Charges	Pushing Average Opacity For 4 Pushes	Stack No. of 6-Min Averages >30% Opacity Per Hour
5	12-05-90	3.2%	0	0.0%	0.0%	45	13.3%	0
	12-06-90	0.0%	0	0.0%	3.3%	32	12.7%	0
	12-14-90	0.0%	3	0.0%	0.6%	9	12.9%	0
	12-15-90	0.0%	0	0.0%	1.3%	26	13.8%	0
	12-20-90	3.2%	0	0.0%	0.6%	76	14.7%	0
	12-21-90	0.0%	0	0.0%	3.3%	46	3.9%	*
	12-26-90	0.0%	0	0.0%	0.0%	55	3.6%	0
	12-27-90	0.0%	0	0.0%	3.2%	14	3.6%	0
Average		0.8%	0.4	0.0%	1.5%	37.9	9.8%	0.0
7	12-01-90	1.2%	0	0.0%	2.5%	2	6.9%	0
	12-05-90	0.0%	0	0.4%	0.6%	7	1.7%	0
	12-06-90	0.0%	1	1.7%	2.0%	7	10.7%	0
	12-14-90	0.0%	0	0.0%	2.6%	3	10.2%	0
	12-15-90	0.0%	0	0.0%	0.0%	10	18.3%	0
	12-20-90	0.0%	0	0.0%	2.6%	5	6.2%	0
	12-21-90	2.6%	0	0.0%	4.5%	13	24.4%	*
	12-26-90	0.0%	0	0.0%	0.0%	4	4.9%	0
	12-27-90	0.0%	0	0.0%	6.5%	0	3.5%	0
Average		0.4%	0.1	0.23%	2.4%	5.7	9.6%	0.0
Limitation:		10.0%	3	3.0%	10.0%	125	20.0%	30.0%

* = No Inspection

0.19 lb/ton of coal to see if J&L's lower factor of 0.177 could be justified. Based on this reexamination, we now believe that a factor of 0.18 lb/ton of coal is the factor that should be used. This is based on the following rationale:

Pushing: 0.47 lb/ton of coal, uncontrolled (AP-42); 90% capture is required by 325 IAC 11-3; limit on controlled emission is 0.04 ~~[illegible]~~ lb/ton of coke (0.028 lb/ton of coal), 325 IAC 11-3. Therefore, 0.047 + 0.028 = 0.075 lb/ton of coal.

Charging: 0.85 lb/ton of coal, uncontrolled (AP-42); 325 IAC 11-3 = RACT = approx. 95% control. Therefore, 0.043 lb/ton of coal.

Oven Door Leaks: 0.51 lb/ton of coal, uncontrolled (AP-42); 325 IAC 11-3 = RACT = approx. 90% control. Therefore, 0.051 lb/ton of coal.

Charging Lids and Offtakes: 0.009 lb/ton of coal based on a method using results from USEPA topside leak test, 1979, and requirements of 325 IAC 11-3.

Recognizing the uncertainty of these factors, we round to two decimal places and obtain:

Pushing	0.08
Charging	0.04
Door Leaks	0.05
Lid and Offtakes	0.01
Total	0.18 lb/ton of coal

U.S. EPA believes that this composite emission factor of 0.18 lb/ton of coal would represent emissions from pushing, charging, door leaks, and charging lid and offtake leaks for a coke oven battery in compliance with the requirements of 325 IAC 11-3. As we recommended in our comments of July 20, 1982, the General Notes should indicate that this emission factor, when listed as a short term emission limit in Appendix A of 6-1-10.1, should be used only "for the purpose of determining emission offsets resulting from source shutdown." We recognize that a company might want to have a higher emission limit than 0.18 lb/ton of coal in order to provide greater emission offsets for future growth. We recommend, however, that the emission limit of 0.18 lb/ton of coal be used for fugitive emissions from all coke oven batteries in the Strategy and that future growth be provided for, instead, by operating permits which would allow higher-than-expected production rates for individual coke batteries. Since some coke oven batteries were modeled in the final attainment demonstration with emission limits higher than 0.18 lb/ton of coal, production rates could be increased to a comparable extent in operating permits without jeopardizing the attainment demonstration.

4. We recommend that the mass emmission limit for U.S. Steel's Number 2 Q-BOP Basic Oxygen Furnace Shop Roof Monitors be revised to read: "0.85 lb/ton." Our previous acceptance of the 0.52 lb/ton factor was conditioned on U.S. Steel's providing an adequate justification for

RSI4

79-39.1

Organic Air Emissions from Coke Quench Towers

Robert V. Hendriks

U.S. Environmental Protection Agency
Research Triangle Park, North Carolina

A.H. Laube
J. Griffin

York Research Corporation
Stamford, Connecticut

000122

For Presentation at the 72nd Annual Meeting of the
Air Pollution Control Association
Cincinnati, Ohio June 24-29, 1979

TABLE 7

PARTICULATE TEST RESULTS

Parameter		Average Value Tests 1-17
% Isokinetic		100.0
Flowrate (SCM)		4819.
% Moisture		24.4

Particulate Emissions[a]	Clean Makeup Water kg/metric ton of coal	Contaminated Makeup Water kg/metric ton of coal
Benzene soluble tests	Tests 1,2	Test 13
Cyclone	0.28	0.42
Probe/nozzle/condenser/ adsorber	0.25[c]	0.53
Filter	0.005[b]	0.04
Total particulate catch	0.52[b]	0.99
Tests 2B-12[b]	-	-
Cyclone	0.31	-
Probe/nozzle	0.08[b]	-
Filter	0.32[b]	-
Total particulate catch	0.68[b]	-
Tests 14-17[b]	-	-
Cyclone	-	0.89
Probe/nozzle	-	0.10
Filter	-	0.15
Total particulate catch	-	1.14

[a] There are no particulate results for the condenser and adsorber samples for Tests 2B-12 and 14-17.

[b] In several tests, particulate filters were destroyed by the impaction of fine particulate upon the filter media. Results of these tests are not included in the averages.

[c] Tests 1,2, and 13 were analyzed for benzene soluble residue by analyzing each sampling train component individually. Included in this analysis was total particulate in the condenser and adsorber. In Test 2, the condenser sample appeared contaminated and is not included in the average.

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ATTACHMENT J

PROPOSED COKE BATTERY DOOR PERFORMANCE STANDARDS

The proposed coke battery door performance standards presented at the April 14, 1992 meeting are as follows:

> #2 Battery 8% 30 day rolling average;
> #5 Battery 7% 30 day rolling average;
> #3/7 Battery 6% 30 day rolling average.

These limits are more stringent than the proposed limits and do not include any exclusions which are in the current standards. The target date for compliance with these limits is January 1993.

PROPOSED BLAST FURNACE CASTHOUSE OPACITY LIMIT

The proposed blast furnace casthouse roof monitor opacity limit as presented at the April 14, 1992 meeting is as follows:

> The opacity of visible emissions, other than water mist or vapor, from blast furnace casthouse roof monitors shall not exceed twenty (20) percent per cast as determined on a six (6) minute rolling average. When determining the six (6) minute rolling average basis, a maximum of ten (10) minutes per cast (forty 15 second observations) shall be excluded from the rolling average calculation. EPA test Method 9 shall be utilized to determine compliance with this limit.

PROPOSED NO. 1 BOP SHOP ROOF MONITOR OPACITY LIMIT

The proposed No. 1 BOP shop roof monitor opacity limit as presented at the April 14, 1992 meeting is as follows:

> The opacity of visible emissions, other than water mist or vapor, from the No. 1 BOP Shop roof monitor shall not exceed twenty (20) percent per hour as determined on a six (6) minute rolling average. When determining the six (6) minute rolling average basis, a maximum of ten (10) minutes per hour (forty 15 second observations) shall be excluded from the rolling average calculation. EPA test Method 9 shall be utilized to determine compliance with this limit.

PROPOSED NO. 2 Q-BOP SHOP ROOF MONITOR OPACITY LIMIT

At present, USS is not proposing a specific opacity limit for the No. 2 Q-BOP Shop roof monitor. USS has proposed to install an enclosed hood evacuation system at the No. 2 Q-BOP shop to capture and control charging, tapping and primary fugitive emissions. Details of this system were provided to IDEM on March 27, 1992. USS proposes that design specifications and operating and maintenance practices be developed for this proposed control system for inclusion in the rule. However, until the system is installed and operational, USS is not proposing a specific opacity limit for this source.

cBill / File

U. S. Steel
Gary Works
One North Broadway
Gary, IN 46402-3199

April 7, 1992

Mr. Shri Harsha
Indiana Office of
Air Management
105 South Meridian Street
P. O. Box 6015
Indianapolis, Indiana 46206-6015

Lake County PM10 SIP, Gary Works
Coke Quench Tower Emission Limits

Dear Mr. Harsha:

Per our discussion on March 27, 1992, U.S. Steel is proposing the following limits and monitoring requirements for the Gary Works coke quenching operation:

Limitation

- The total dissolved solids (TDS) component of coke quench water makeup shall not exceed a concentration of 1500 milligrams per liter (mg/l) as measured by USEPA Method 160.1 or Method 2540C, as described in the seventeenth edition of ***Standard Methods for the Examination of Water and Wastewater***.
- Coke quench water makeup shall be defined as a flow proportioned mixture of process wastewater and service (Lake Michigan) water as introduced into each coke quencher sump as makeup water to the coke quench system.

Monitoring

- U.S. Steel shall continuously monitor the total flow of process wastewater and service water introduced as coke quench water makeup to each active coke quencher sump.
- U. S. Steel shall monitor the total dissolved solids (TDS) concentration of each coke quench water makeup source for each active coke quencher sump on a daily basis. A 24-hour composite sample, consisting of no fewer than three equal volume sample increments, shall be collected for each coke quench water makeup source and the total dissolved solids (TDS) concentration shall be determined for each 24-hour composite sample.

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Compliance Determination

- ❑ For each active coke quencher sump compliance shall be determined by calculating a flow-weighted average total dissolved solids (TDS) concentration of the coke quench water makeup. Compliance shall be deemed to have been met if the calculated total dissolved solids (TDS) concentration for the makeup to each active coke quencher sump does not exceed 1500 milligrams per liter (mg/l).

Recordkeeping

- ❑ U.S. Steel shall maintain records of the sampling results for each active coke quencher sump onsite. Records shall be available for inspection and shall be maintained for a period of not less than two (2) years.

The implementation of the daily monitoring component of this proposal will result in an additional annual cost of over $25,000, plus installation and maintenance costs for the continuous flow measurement instrumentation. This is a very significant cost for a source whose effect on the NAAQS is insignificant.

Please call me is you have any questions regarding this correspondence

Very truly yours,

WS Kubiak

W. S. Kubiak
Manager - Environmental
Compliance

WSK:jah
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cc TJMethod
DKuh
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